ISSN 0895-7177

MATHEMATICAL AND COMPUTER MODELLING

EDITOR-IN-CHIEF: Ervin Y. Rodin

List of Contents and Author Index
Volume 30, 1999

PERGAMON

MATHEMATICAL AND COMPUTER MODELLING

Editor-in-Chief

Ervin Y. Rodin

Department of Systems Science and Mathematics
Campus Box 1040, Washington University
One Brookings Drive
St Louis, MO 63130-4899, U.S.A.
Tel.: 314-935-6007 or 935-5806
Fax: 314-935-6121
publish@rodin.wustl.edu

Book and Survey Editor: **D.N.P. Murthy,** Department of Mechanical Engineering, University of Queensland, St Lucia, Brisbane, Qld 4067, Australia. e4murthy%uqvax.decnet.uq.oz.au@uunet.uu.net

Editorial Assistant: **Christee Zimmermann,** Department of Systems Science and Mathematics, Campus Box 1040, Washington University, One Brookings Drive, St Louis, MO 63130-4899, U.S.A.

Advice to Authors

The readers of our Journal may notice that the time difference between the earliest "Received" date and the latest date of any article in a given issue may be more than a year. What causes such differences, and how can you, a prospective author, be assured of a very speedy publication?

Every high quality scientific journal has the very natural desire to publish only first class, quality works. In the case of many journals, that is the only, perfectly reasonable and appropriate, objective. However, there exist quite a few scientific endeavors today, for which the speed of publication also plays a very important role. I believe that our field, dealing with the applications of mathematics and computers, is definitely a member of the latter group. An easy solution to the achievement of speedy publication is the utilization of an author prepared electronic version.

In this journal, we are trying to perform a triple-objective optimization:

(a) to publish works of the highest quality;
(b) to publish them speedily;
(c) to have them typeset uniformly.

If you are a prospective author, you can help speed your paper towards publication in the following ways:

1. In order to insure quality, all published papers are refereed carefully. Please be sure to select that Editor from our Board whose interests are closest to the subject of your paper. We require that each manuscript be accompanied by a list of 6 to 8 potential referees (non-editorial board members, please) including current addresses. In many cases, that Editor will be willing to review your work himself, availing himself of perhaps only one more referee—a speedy process. However, if you send it to just anyone on our Board, it may take some time before that person even finds appropriate referees—not all of whom are willing to do a fast enough review of your paper, thus causing the first major delay.

2. After a paper is accepted, it has to be typeset, unless that job was already done by you and/or by your secretary. **We typeset all of our papers in AMS$\TeX$, amsppt.sty "style file." That is how we achieve uniformity.** Therefore, the best that you can do is this: submit to us, on a diskette or via e-mail, such a $\TeX$ version of your work. In all likelihood, it will be printed in the next available issue, because you will not need to have a galley proof! The second best option is to provide us with a $\LaTeX$ or any other $\TeX$ file, for then you are again helping considerably; our work is minimized. In most such instances, authors also do not need to receive galley proofs. We send them only if there are major departures from your original format.

3. The third "speedup" option is to provide us with any electronic version of your manuscript—such as Microsoft Word. In this case, you will receive galley proofs, but in a shorter time.

4. If figures are included in your paper, please submit them in Postscript® format in addition to a hardcopy version. From the Postscript® format, figures are imported directly into the $\TeX$ file. The next best option for figures is to submit them electronically in any format that is compatible with the most current version of Adobe Photoshop®. We can quickly convert them to Postscript® within Photoshop®. If we receive figures in a different format, it can be time consuming to convert them, sometimes with limited success requiring us to request Postscript® files from the author, and further delaying the publication of the paper.

5. Finally, when we send out a galley proof, we request that the author return it within 48 hours. Until we receive it back, of course, we cannot proceed.

And so, the above is an explanation as to why such discrepancies in the "Received" dates can occur within one single issue. With your help, and the tips above, hopefully your next paper will be published very quickly, indeed!

Ervin Y. Rodin
Editor-in-Chief

♾ The paper used in this publication meets the minimum requirements of American National Standard for Information Sciences—Permanence of Paper for Printed Library Materials, ANSI Z39.48-1984.

List of Contents

NUMBER 1/2

J.-D. Lee	1	Wavelet Transform for 3-D Reconstruction from Series Sectional Medical Images
L. Arlotti, N. Bellomo and **K. Latrach**	15	From the Jager and Segel Model to Kinetic Population Dynamics Nonlinear Evolution Problems and Applications
K. W. Blayneh	41	Cannibalism in a Seasonal Environment
R. P. Agarwal and **S. R. Grace**	53	The Oscillation of Certain Difference Equations
C. A. Spade and **V. A. Volpert**	67	Mathematical Modeling of Interfacial Gel Polymerization
H.-H. Bock, W. H. E. Day, E. Kubicka, G. Kubicki and **F. R. McMorris**	75	Attainable Results in Committee Elections
B. G. Zhang and **B. M. Liu**	89	Linearized Oscillation Theorems for Certain Nonlinear Difference Equations with Continuous Arguments
F. A. B. Coutinho, E. Massad, L. F. Lopez, M. N. Burattini, C. J. Struchiner and **R. S. Azevedo-Neta**	97	Modelling Heterogeneities in Individual Frailties in Epidemic Models
J. Wu, T. Faria and **Y. S. Huang**	117	Synchronization and Stable Phase-Locking in a Network of Neurons with Memory
M. Bravi and **L. Rondoni**	139	Tests of the Linear Models in a New System Approach in Estimate Theory
Z. Liu, S. A. Trogdon and **J. Yong**	149	Modeling and Analysis of a Laminated Beam
J. Jemmer, K. Kratz and **N. Read**	169	Symbolic Algebra in the Analysis of Bacterial Populations
F. Chen and **D. Suter**	179	DIV-CURL Vector Quasi-Interpolation on a Finite Domain
A. Charalambopoulos, D. I. Fotiadis and **C. V. Massalas**	205	Dynamic Response of the Human Head to an External Stimulus
L. A. V. Carvalho	225	Modeling Distributed Concept Representation in Hopfield Neural Networks

NUMBER 3/4

RETRIAL QUEUEING SYSTEMS

J. R. Artalejo	xiii	Preface
J. R. Artalejo	1	Accessible Bibliography of Retrial Queues
B. D. Choi and **Y. Chang**	7	Single Server Retrial Queues with Priority Calls
G. I. Falin	33	A Multiserver Retrial Queue with a Finite Number of Sources of Primary Calls
H. Li and **T. Yang**	51	Steady-State Queue Size Distribution of Discrete-Time *PH/Geo/* 1 Retrial Queues
V. V. Anisimov	65	Averaging Methods for Transient Regimes in Overloading Retrial Queueing Systems
J. R. Artalejo and **A. Gómez-Corral**	79	Performance Analysis of a Single-Server Queue with Repeated Attempts
P. P. Bocharov, **O. I. Pavlova** and **D. A. Puzikova**	89	*M/G/* 1/*r* Retrial Queueing Systems with Priority of Primary Customers
B. D. Choi and **Y. Chang**	99	$MAP_1,MAP_2/M/c$ Retrial Queue with the Retrial Group of Finite Capacity and Geometric Loss
A. Dudin and **V. Klimenok**	115	Queueing Systems BMAP/*G*/1 with Repeated Calls
A. Elcan	129	Asymptotic Bounds for an Optimal State-Dependent Retrial Rate of the *M/M/* 1 Queue with Returning Customers
A. Gómez-Corral and **M. F. Ramalhoto**	141	The Stationary Distribution of a Markovian Process Arising in the Theory of Multiserver Retrial Queueing Systems
T. Hanschke	159	A Matrix Continued Fraction Algorithm for the Multiserver Repeated Order Queue
C. Langaris	171	Gated Polling Models with Customers in Orbit
H.-M. Liang	189	Service Station Factors in Monotonicity of Retrial Queues
A. Rodrigo and **M. Vázquez**	197	Large Sample Inference in Retrial Queues
S. N. Stepanov	207	Markov Models with Retrials: The Calculation of Stationary Performance Measures Based on the Concept of Truncation

NUMBER 5/6

K. M. Liu	1	Dimensional Reduction for the Plate in Elasticity on an Unbounded Domain

J. A. Adam	23	A Simplified Model of Wound Healing (With Particular Reference to the Critical Size Defect)
P. Jemmer	33	Symbolic Algebra in the Analysis of Dynamic Chemical-Kinetic Systems
A. D. Drozdov	49	Modelling the Nonlinear Viscoelastic Behavior of Amorphous Glassy Polymers
M. D. Roselló and **L. Jódar**	73	Mixed Problems for Separate Variable Coefficient Diffusion Equations: The Non-Dirichlet Case Approximate Solutions with *A Priori* Error Bounds
H.-L. Hong, F.-H. Wong and **C.-C. Yeh**	89	Classification of Positive Solutions of Generalized Functional Differential Equations
D. Greenspan	101	The Use of Particle Simulation in Contact Mechanics
J. V. Manojlović	109	Oscillation Criteria for Second-Order Half-Linear Differential Equations
J. Ye and **R. Qu**	121	Fairing of Parametric Cubic Splines
K. A. Rink, E. Y. Rodin, V. Sundarapandian and **M. A. Redfern**	133	Routing Airlift Aircraft by the Double-Sweep Algorithm
P. G. Raeth and **J. M. Reising**	149	Transitioning Basic Research to Build a Dynamic Model of Pilot Trust and Workload Allocation
L. Ingber	167	A Simple Options Training Model
E. L. Stott, N. F. Britton, J. A. Glazier and **M. Zajac**	183	Stochastic Simulation of Benign Avascular Tumour Growth Using the Potts Model
Y. Yavin	199	Open-Loop Control Laws for a Vehicle Towing Three Trailors
I. Kramer	211	Epidemiological Evidence and Immunological/Mathematical Model of Acquired Cytotoxic T Lymphocyte Immunity to HIV Infection in AIDS Risk Populations

NUMBER 7/8

A. Nagurney	1	Economic Equilibrium and Financial Networks
M. Kurano, M. Yasuda, J.-I. Nakagami and **Y. Yoshida**	7	Fuzzy Decision Processes with an Average Reward Criterion
D. O'Regan	21	Weakly Contractive Zero Epi Maps

A. A. Batabyal and H. Beladi	27	The Stability of Stochastic Systems: The Case of Persistence and Resilience
A. Adamatzky, C. Melhuish and O. Holland	35	Morphology of Patterns of Lattice Swarms: Interval Parameterization
G. Ökten	61	Error Reduction Techniques in Quasi-Monte Carlo Integration
H. Fenie and **I. A. Frigaard**	71	Transient Fluid Motions in a Simplified Model for Oilfield Plug Cementing
M. A. Medina	93	Validation and Simulations of a Quasi-Steady State Heat Balance Model of Residential Walls
M. A. Medina	103	A Quasi-Steady-State Heat Balance Model of Residential Walls
L. Egghe	113	Detection and Correction of Multiple Errors in General Block Codes
A. J. Perumpanani and **J. Norbury**	123	Numerical Interactions of Random and Directed Motility During Cancer Invasion
C. Aprea and **C. Renno**	135	An Air Cooled Tube-Fin Evaporator Model For an Expansion Valve Control Law
K.-H. Wu, C.-H. Chen, J.-M. Ko and **J.-D. Lee**	147	Path Planning and Prototype of an AGV
G. Naadimuthu, K. S. Raju and **E. S. Lee**	169	A Heuristic Dynamic Optimization Algorithm for Irrigation Scheduling
S. A. Ghozati	185	A Finite Automata Approach to Modeling the Cross Product of Interconnection Networks
M. J. Kaiser	201	Crystals, Gauges, Podals, and Polars

NUMBER 9/10

L. Jódar and **M. D. Roselló**	1	Mixed Problems for Separate Variable Coefficient Wave Equations: The Non-Dirichlet Case. Continuous Numerical Solutions with *a priori* Error Bounds
S. I. Barry and **G. N. Mercer**	23	Flow and Deformation in Poroelasticity—I Unusual Exact Solutions
G. N. Mercer and **S. I. Barry**	31	Flow and Deformation in Poroelasticity—II Numerical Method
L. Jódar and **D. Goberna**	39	Analytic-Numerical Solution with *a priori* Error Bounds for Coupled Time-Dependent Telegraph Equations: Mixed Problems
Z. Wang and **Z. Lu**	55	Global Stability for a Lotka-Volterra Reaction-Diffusion System with a Qualitatively Stable Matrix

G.-T. Wang, B. Q. Li and S. Chen	63	A Semianalytical Method for Solving Equations Describing the Transport of Contaminants in Two-Dimensional Homogeneous Porous Media
F. Cammaroto, A. Chinnì and G. Sturiale	75	A Remark on Ekeland's Principle in Locally Convex Topological Vector Spaces
A. S. Ackleh	81	Parameter Identification in Size-Structured Population Models With Nonlinear Individual Rates
R. J. Villanueva, A. Hervás and M. J. Salazar	93	Analytical-Numerical Solution of Coupled Singular Mixed Diffusion Type Problems
W. Gille and H. Handschug	107	Chord Length Distribution Density and Small-Angle Scattering Correlation Function of the Right Circular Cone
Y. Lenbury, S. Rattanamongkonkul, N. Tumrasvin and S. Amornsamankul	131	Predator-Prey Interaction Coupled by Parasitic Infection: Limit Cycles and Chaotic Behavior
R. U. Verma	147	I-G-H-KKM Mappings and Minimax Inequalities
E. Zakarian and R. Glowinski	153	Domain Decomposition Methods Applied to Sedimentary Basin Modeling
M. Losada	179	The Complex Dynamics of High Performance Teams
K. S. Anderson and S. Duan	193	A Hybrid Parallelizable Low-Order Algorithm for Dynamics of Multi-Rigid-Body Systems: Part I, Chain Systems
J. F. Feng and B. Tirozzi	217	Learning in a Higher-Order Simple Perceptron
D. J. Reid	225	Optimising the Flow of Information within a C3I Network

NUMBER 11/12

D. O'Regan	1	Continuation Principles and *d*-Essential Maps
J. Wu	7	Maximal Attractor, Stability, and Persistence for Prey-Predator Model with Saturation
J. M. Tarela and M. V. Martínez	17	Region Configurations for Realizability of Lattice Piecewise-Linear Models
H. W. Hethcote, Y. Li and Z. Jing	29	Hopf Bifurcation in Models for Pertussis Epidemiology
J. S. Arnold and J. A. Adam	47	A Simplified Model of Wound Healing II: The Critical Size Defect in Two Dimensions
P. Jemmer	61	Mathematical Modeling and Interpretation of Reactive Plasma Chemistry

N. N. Librizzi, J. H. Long, Jr. and **R. G. Root**	77	Modeling a Swimming Fish with an Initial Boundary Value Problem: Unsteady Maneuvers of an Elastic Plate with Internal Force Generation
T. J. Leger, J. M. Wolff and **P. S. Beran**	95	Improved Determination of Aeroelastic Stability Properties Using a Direct Method
A. Ali El-Feki, P. Broadbridge and **G. W. Walter**	111	Potential Transients for an Electrochemical Corrosion Reaction under Constant Current Conditions
P. R. Parthasarathy, N. Selvaraju and **G. Manimaran**	133	A Paired Queueing System Arising in Multimedia Synchronization
Y. Yavin	141	Modelling and Control of the Motion of a Trolley: Effect of Motor Dynamics on the Dynamical Model
Y. Yoshida	147	A Stopping Game in a Stochastic and Fuzzy Environment
H. Gzyl, A. Tagliani and **Y. Velasquez**	159	A Comparative Study of Some Reconstruction Methods for Linear Inverse Problems
J. Kreimer	169	Real-Time Multiserver and Multichannel Systems with Shortage of Maintenance Crews
E. Balakrishnan, M. I. Nelson and **G. C. Wake**	177	Radiative Ignition of Combustible Materials I. Polymeric Materials Undergoing Nonflaming Thermal Degradation—The Critical Storage Problem
J.-S. Heh	197	Evaluation Model of Problem Solving
W. Zhang and **K. Huseyin**	213	Computation of the Coefficients Associated with the Normal Form of a Resonant Five-Dimensional System